

CLAIMS

I/We claim:

- [c1] 1. A method in a computer for estimating an LVMI for a patient based on ECG data, the method comprising:
 - calculating an ST time-voltage parameter representing the area of the ST segment of the ECG data;
 - calculating an STT time-voltage parameter representing a portion of the area of the STT segment the ECG data;
 - calculating a QRS time-voltage parameter representing a QRS time integral;
 - calculating a modified Cornell Product time-voltage parameter;
 - adjusting each calculated time-voltage parameter based on a weighting factor for that parameter; and
 - summing the adjusted time-voltage parameters as an estimate of the LVMI.
- [c2] 2. The method of claim 1 wherein the weighting factors are gender-specific.
- [c3] 3. The method of claim 1 wherein the ST time-voltage parameter for a male is based on lead V1.
- [c4] 4. The method of claim 1 wherein the ST time-voltage parameter for a female is based on lead I.
- [c5] 5. The method of claim 1 wherein the STT time-voltage parameter is based on lead V5 for males.

- [c6] 6. The method of claim 1 wherein the STT time-voltage parameter is defined from the J point extending approximately 176 ms for males.
- [c7] 7. The method of claim 1 wherein the STT time-voltage parameter is based on lead V6 for females.
- [c8] 8. The method of claim 1 wherein the STT time-voltage parameter is defined from the J point extending approximately 240 ms for females.
- [c9] 9. The method of claim 1 wherein the QRS time-voltage parameter is a QRS time integral of a derived Frank vector amplitude in the XZ plane.
- [c10] 10. A method in a computer for diagnosing LVH in a patient, the method comprising:
 estimating an LVMI based on time-voltage parameters derived from ECG data of the patient;
 generating an initial likelihood of LVH based on the estimated LVMI; and
 adjusting the initial likelihood based on one or more confounders that have been identified for the patient to give a likelihood that the patient has LVH.
- [c11] 11. The method of claim 10 wherein the time-voltage parameters include an ST time-voltage parameter, an STT time-voltage parameter, a QRS time-voltage parameter, and a modified Cornell Product time-voltage parameter.
- [c12] 12. The method of claim 11 including adjusting each calculated time-voltage parameter based on a weighting factor for that parameter.
- [c13] 13. The method of claim 12 including summing the adjusted time-voltage parameters as an estimate of the LVMI.

- [c14] 14. The method of claim 10 wherein the generating of the initial likelihood is gender-specific.
- [c15] 15. The method of claim 10 wherein the adjusting of the initial likelihood is gender-specific.
- [c16] 16. The method of claim 10 wherein the confounders include conduction blocks.
- [c17] 17. The method of claim 16 wherein the adjustment is based in part on whether a high QRS voltage is detected.
- [c18] 18. The method of claim 16 wherein the adjustment is based in part on the duration of the QRS.
- [c19] 19. The method of claim 10 including additionally adjusting the initial likelihood based on area of the T wave in V4.
- [c20] 20. The method of claim 10 including additionally setting the likelihood to negligible when the time-voltage parameters do not meet certain thresholds.
- [c21] 21. The method of claim 10 including selecting a statement of the diagnosis based on whether the adjusted likelihood indicates no, minimal, moderate, or strong evidence of LVH.
- [c22] 22. The method of claim 10 including selecting a rationale statement for the diagnosis based on time-voltage parameters.
- [c23] 23. The method of claim 22 wherein the selection of the rationale statement is gender-specific.

- [c24] 24. The method of claim 10 wherein the estimating of LVMI is gender-specific.
- [c25] 25. The method of claim 10 wherein the estimating is based on data modeling of ECG data and LVMI measurements for a population.
- [c26] 26. A method in a computer for estimating the LVMI for a patient, the method comprising:
 calculating time-voltage parameters derived from ECG data of the patient;
 adjusting the calculated time-voltage parameters based on a weighting factor for each parameter; and
 combining the adjusted time-voltage parameter to estimate the LVMI for the patient
 wherein the parameters and weight factors are derived from data modeling of ECG data and LVMI measurements for a population.
- [c27] 27. The method of claim 26 wherein the time-voltage parameters include an ST time-voltage parameter, an STT time-voltage parameter, a QRS time-voltage parameter, and a modified Cornell Product time-voltage parameter.
- [c28] 28. The method of claim 26 wherein the estimating is gender-specific.
- [c29] 29. The method of claim 26 including adjusting each calculated time-voltage parameter based on a weighting factor for that parameter.
- [c30] 30. The method of claim 26 wherein the weighting factors are gender-specific.
- [c31] 31. The method of claim 26 wherein the combining includes summing the adjusted time-voltage parameters.

- [c32] 32. A method in a computer system for presenting evidence of LVH in a patient, the method comprising:
 providing an indication of the strength of the evidence that a patient has LVH; and
 displaying a graph in which the strength of the evidence is indicated by a length of the graph.
- [c33] 33. The method of claim 32 wherein the graph is a horizontal bar graph.
- [c34] 34. The method of claim 32 wherein the bar graph is displayed on an ECG printout.
- [c35] 35. The method of claim 32 including displaying a statement of the evidence adjacent to the graph.
- [c36] 36. The method of claim 32 including displaying a statement of rationale adjacent to the graph.
- [c37] 37. The method of claim 32 wherein the graph is a bar graph and the evidence ranges from minimal to strong.
- [c38] 38. The method of claim 32 including suppressing the displaying of the graph when there is no evidence of LVH.
- [c39] 39. A computer system for diagnosing LVH in a patient, comprising:
 means for modeling LVMI based on ECG data and LVMI measurements for a population;
 means for estimating LVMI for a person based on the model and ECG data for the person; and

means for generating an indication of the likelihood of LVH based on the estimated LVMI and adjustment rules.

[c40] 40. A computer system for assisting in the diagnosing of LVH in a patient, comprising:

a component that estimates an LVMI for the patient based on gender-specific, time-voltage parameters and ECG data of the patient; and
a component that generates a likelihood that the patient has LVH based on the estimated LVMI and various adjustment rules.

[c41] 41. The computer system of claim 40 wherein the adjustment rules are based on the presence of confounders in the patient.

[c42] 42. The computer system of claim 40 wherein the adjustment rules are based on threshold values for the time-voltage parameters.

[c43] 43. The computer system of claim 40 including:
a component that selects statements of evidence of LVH based on the generated likelihood.